recd No 2 Pr. P. #16

S.W.C. 8th & Walnut

An inquiry

into

the secretion of bile.

By

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Passed March 5th 1826

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Whether is bile generated by the liver, or does it exist in the blood?

As a portion of the investigation of this subject will be analogical, & as this will consist principally, or entirely, in comparing the office of the liver with that of the kidneys, it appears necessary, that I should in the first place, inquire into the office of the latter in the production of urine.

How is urine formed?

The opinion most generally adopted & the one that has existed contemporary with the earliest dawn of physiological knowledge, is that it is formed by a specific action of the kidneys. But many facts & some experiments which are related in the annals of medical history, cause the correctness of this very ancient & popular doctrine to be somewhat questioned, at least sufficiently so as to solicit a physiological investigation.

There are recorded by authors especially the more ancient many cases in which the secretion

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tion of urine was suppressed, & the urine instead of passing through its natural channels, was thrown off by some other emunctory or part, as the skin, ear, navel, alimentary canal &c. With similar cases our periodical works likewise abound. The explanation of which phenomena presents difficulties greater than would upon a slight view of the subject have been anticipated.

Dr. Fisher in his truly learned discourse, on Paruria erratica, which made its appearance in the last number of the New England journal, observes that there are but three modes, by which these very singular cases can be accounted for.

First – The urine after it has arrived in the bladder, may perhaps be absorbed from that organ by its lymphatic vessels, & then be taken up from these vessels by other lymphatics which anastomose with them, & carried by a backward & retrogade action of these vessels, to the part ~~out~~ which it is to be discharged.

Second – The urine having been secreted by the kidneys

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may possibly be absorbed by the lymphatics & conveyed by them into the general circulating system, & then be carried to the unnatural outlets by the arteries of these parts.

Third – The urine may possibly be formed by the extreme vessels which naturally convey blood, supposing them to take on a new action or one similar to that of the extreme vessels of the kidneys, which naturally secrete urine.

To which I beg permission to add a fourth – That urine is formed in the blood, its formation being independent of the kidneys & that these organs refusing to perform their duty, by giving vent to it, subsequently to its formation, it is thrown off by some other emunctory, but without its extreme vessels assuming, the presumed specific action of the kidneys, its formation previously to reaching them, superseding the necessity.

I will briefly consider the merits of each.

Dr. Fisher argues the impracticability of the first, in my opinion, with considerable plausibility, for the reqn

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gestation of the original & ingenious Darwin, reminds me of the phlogiston of the ancient chymists - a convenient supposition for the solution of those phenomena otherwise inexplicable.

Does it not appear extremely doubtful that the urine should travel from the bladder, to the ear (for instance) through the anastomoses of the extreme branches of the absorbents, to do which it must "proceed in innumerable zigzag directions, & take a long circuitous route, & pass through the extremities of the lymphatics of nearly one half of the body, in order to arrive" at its place of exit?

His objection to the second is that the introduction of urine into the blood would prove fatal. His reasoning on this subject is refuted by the detection of urea in the blood, instances of which shall be related in the sequel.

His general objection - that is the one - the one applying to each of the first, is very correct, by the inefficiency of each of them in explaining those cases in which

the urine did not pass through the kidneys and complexions, which will be mentioned hereafter.

In the third hypothesis, in which Dr Fisher appears much attached & supported with no little zeal an obstacle insurmountable presents itself. That parts so different in appearance & anatomical structure as for example the kidneys & skin should either of them take on the specific action of the other, an action so different from their own as their products urine & sweat, appears too improbable to admit of such supposition.

If the skin is thus adequate to the formation of proper urine, where is the necessity of this notable difference in structure between the skin & kidneys? Why, not the same organ & tissue similar in formation be appropriated for generating, this, more quickly by these or a part? This certainly would be more simple, consequently more consistent with the general rules of nature. Besides, to admit Dr Fisher's doctrine would

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[illegible] is [illegible] in [illegible] respects not [illegible] [illegible] [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

of these vacuous discharges were formed in the fifth
jar action, assumed by the extreme rarity of upwards
from which they extend as far as a foot of
which the longest was then discharged in the sec
ond jar action. This was certainly inexplicable by the rules
notes.

This case occupies the position
of the second which is also referred to the explana
tion of the ~~[illegible]~~ phenomena given be
low it. It would be unnecessary to doubt that
such quantities of urine could have been ex
tracted from the bladder as was daily discharged
by hydrogen sulphide, when the urine was repeatedly
of a specific gravity. Besides it was proved, that
in proportion to the quantity of urine in the blad
der was the time required for the accumulation of the hydrogen
which should not have been the case were it dependent
on this process, for at that time, if
the relative [illegible] would be [illegible]

of the [illegible] recommendation [illegible]
[illegible]
~~[illegible]~~ excited to great [illegible]. by the [illegible] of necessity
[illegible]
[illegible]
[illegible]

[illegible]
[illegible]
[illegible]
[illegible]

The [illegible]
[illegible]
[illegible]
[illegible]
[illegible]

[illegible]
[illegible] agree [illegible]
[illegible] presentiment of death. [illegible]
[illegible] when [illegible] in the closet [illegible]

[illegible] formation [illegible]

[illegible]

[illegible]

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[illegible]

[illegible]

[illegible]

There is a case related in which the [illegible] com-pletely disorganized being simply a [illegible] and yet there was a [illegible] [illegible] [illegible] the [illegible] [illegible] [illegible] was made out of the [illegible] of all those which might [illegible] an individual.

How was his placenta formed? [illegible] [illegible] these organs almost [illegible] of the [illegible] of his placenta, in [illegible] in a condi-tion which rendered them entirely incapable of per-forming [illegible] office.

This evidently proves the generation [illegible] indepen-dent of the [illegible] attendance on the [illegible] is [illegible] inapplicable when the [illegible] de-[illegible] as they [illegible] [illegible] that the placenta has received those or-gans therefore it can only be explained by the [illegible] of the [illegible] upon the impracticability of the former we are compelled to resort to the latter [illegible]

derived in formation, when the phenomenon [illegible] being intricate & [illegible]. The [illegible] existing in the cloud independent of the [illegible]

[illegible]

But [illegible] other [illegible]

[illegible]

[illegible]

This [illegible] necessarily [illegible] the pre-existence of [illegible] existence [illegible] it is [illegible] by a microscope [illegible] by the [illegible] impen- [illegible] by the [illegible] by [illegible] other [illegible]. In the [illegible] hypothesis [illegible] as in the [illegible] producing & for the same [illegible]

[illegible] that all the [illegible] the first [illegible] fall short in [illegible] the phenomena, for the explanation of which [illegible] continued, whereas the [illegible] is [illegible] applicable to [illegible] explanation [illegible] the whole.

It may be maintained [illegible] positive [illegible] of the existence [illegible] Theology [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] by the the liver, except some [illegible], ought to have produced a [illegible] as different from bile, as [illegible] its original [illegible] [illegible] if it is [illegible] something, [illegible] [illegible] the [illegible] [illegible] This process was [illegible] by [illegible] [illegible].

[illegible] ask which is the most [illegible] the [illegible] of the [illegible] of the latter; [illegible] incompatible [illegible] of the [illegible] phenomena [illegible] of [illegible] the part of a separate [illegible] not [illegible] from the system [illegible]

[illegible] the [illegible] of the age, [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible] with [illegible] the epiploon
[illegible] than [illegible] [illegible] [illegible], the [illegible] epiploon
[illegible] [illegible] the epiploon [illegible] [illegible]
with [illegible] [illegible] [illegible] [illegible] even the [illegible] were
tinged in [illegible] parts of the system, with a yellow colour.*
In this case [illegible] [illegible] [illegible] [illegible] [illegible]
in a condition which [illegible] the [illegible] of life [illegible]
[illegible] especially to death in [illegible] [illegible] [illegible] [illegible]
with [illegible], even the [illegible] But [illegible] [illegible] [illegible]
the [illegible] of [illegible] [illegible] of [illegible] cannot [illegible]
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] the extreme branches of the [illegible] [illegible]. [illegible] [illegible]
[illegible] the ducts were not closed completely, but in a [illegible]

* [illegible]

[illegible] [illegible] the secreting [illegible] of the [illegible] [illegible] some cause the closure; [illegible] [illegible] with [illegible] the [illegible] thickness of the [illegible] completely closed, should be not [illegible] a portion [illegible] not a [illegible] would be [illegible] [illegible] [illegible] [illegible].

[illegible] mentions the case of a woman who died of [illegible] [illegible], no bile was found, very black without a particle of [illegible] [illegible] was scarcely the size of [illegible].

The size of this liver independent of its [illegible] [illegible] the power of [illegible] [illegible] of [illegible] [illegible] attributed to it. What is said of the [illegible] is applicable to this.

A diminution or suppression of [illegible] [illegible] is occasionally a cause of jaundice.

Portal relates a case of jaundice caused by a [illegible] [illegible] [illegible] [illegible] is a cause of jaundice the [illegible] [illegible].

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which can not be [illegible] [illegible] [illegible]

situation & anatomical structure of this duct & vena portarum. I am constrained [illegible] to believe that what would compress the duct would also compress the vena, the obstruction which experience has shown speedily to ensue. The parietes of the duct are double the thickness of the vena & composed of a substance much more unyielding. To this it may be replied that pressure of the duct sufficient to cause a rupture would not extend to the vena portarum to the extent necessary for the production of disagreeable consequences.

In proportion to the quantity of blood received into the vena is the quantity of its pressure. This being the case I should imagine were the vena as much more compressible, the capacity of its tube in the transmission of blood, allowing for the pressure received into it, would be more than compensated to the unimpeded vit.

But I do not believe the pressure received by the intestine tumour in a place as elevated as the situation of the vena & duct appears to compress either. I have not observed very attentively, but as far as my observation goes I am led to believe that the base of the intestine tumour has a tendency

is not entirely, & rest against the abdominal walls; from this there is adaptation only, a tendency of the apex to approach the apex regularly to this, the pressure is increased as it is [illegible] towards, the pressure at the superior part of the abdomen, being considerable, while there is comparatively none at the superior, the extremities of the [illegible]

Ischium pregnancy proves a cause of retention from the pressure of the uterine tumour, on the mesenteric veins, previously to the formation of the vena portarum; the circulation being thus impeded, only part of the bile formed, reaches the liver & the remaining portion enters the the yellow hue, the pigments of which has induced it almost a mere [illegible] of a pregnant woman. & it sometimes is of a bronze tint, as to acquire the appellation of jaundice.

The Oedema to which pregnant women are pregnant, is an incidence of the uterine tumour, impeding circulation in the abdominal branches of the vena portarum; thus arising in consequence of the pressure as not receive the blood from the arteries, as freely as necessary, & the arteries relieve themselves by effusion.

Portal believes in a mental jaundice to be caused by alarm.

sure of the hepatic vessels. This is extremely probable, the closure of these vessels for a time impeds the circulation, & is the source of jaundice, which continues until the infantile circulation is completely & rightly established when it disappears.

It is the existing opinion, that the hepatic artery nourishes the liver, & if this artery be tied, its only source of nutriment is cut off, & it must perish. Yet this vessel has been tied & has continued to be secreted. If the bile was formed by the specific action of the liver, the formation of this fluid certainly ought to have ceased with its death, but there was nothing, immediately, to prevent the separation of bile already formed.

If I am not mistaken, it is a fact known to almost all practitioners, that urine is secreted in for a great abundance, when there is an obstruction to its free outlet, & that if the obstruction continues, it almost or entirely ceases, as occurred in Dr Fishes case previously related.

From this circumstance, I am inclined to believe it probable, that in the cases of jaundice caused by obstruction in the ducts, jaundice is not produced by absorption or regurgitation of bile, but that the bile which has passed through the liver remains in the ducts, & that in consequence of the impediment, which the bile meets with, in its outflow

passage - the liver from some mysterious, ~~but~~ well known cause, refuses to transmit any more, which remaining in the system produces jaundice.

In conclusion I will mention, that, I endeavoured to discover on which side of this question truth rested, by experiment, I tied the vena portarum in several cats, (which animals I chose as being extremely tenacious of life) with the view of producing jaundice if practicable, but the operations proved so speedily fatal, that I could not profit from them. Because of the want of time, & the inconvenience of obtaining them, I did not attempt to perform the experiments on any of the cold blooded animals, which I (am) inclined to believe would bear the operation.

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